

Case report

Gangrene of the anterior abdominal wall secondary to urinary bladder rupture due to emphysematous cystitis: A case report

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ARTICLE INFO

Keywords:

Emphysematous cystitis
Gangrenous cystitis
Cystectomy
Urinary bladder rupture

ABSTRACT

Introduction and importance: Emphysematous cystitis is a rare form of urinary tract infection that can cause the bladder wall to rupture. It is more prevalent in patients with diabetes.

Case presentation: We report the case of an 86-year-old man who developed gangrene of the anterior abdominal wall secondary to urinary bladder rupture. We performed a radical cystectomy preceded by an antibiotic treatment.

Clinical discussion: Computed tomography is the key to positive and etiological diagnosis. This is particularly observed among diabetic or immunocompromised patients.

Empirical antibiotic therapy and surgical treatment are the major components of management.

Conclusion: Management of this rare condition is not standardized but involves surgery in most cases.

1. Introduction

Emphysematous cystitis is a rare form of urinary tract infection, characterized by the presence of gas in the cavity and/or the bladder wall. It is an infectious complication secondary to an aero-anaerobic microbial overgrowth. It occurs in diabetic patients in 60 to 70 % of cases [4]. The prognosis, sometimes severe, depends on the treatment duration.

After the advent of antibiotics, its incidence is very rare. The etiology seems to be multifactorial and the exact cause cannot be easily diagnosed [1].

Emphysematous cystitis is a rare form of acute inflammation of the bladder mucosa and the underlying muscle. It is observed most often in middle-aged patients with diabetes (50 % of cases) and is twice as common in women as in men.

The scanner is the reference examination both for the positive diagnosis (parietal emphysema and presence of bladder endoluminal gas) and for the differential and/or etiological diagnosis.

The clinically severe form (septic shock, acute abdominal pain syndrome) should evoke gangrenous cystitis, which has become rare (240

published cases, most of them pre-dating the antibiotic era) but justifies the use of special treatments, hyperbaric oxygen therapy and sometimes requires an emergency cystectomy [2].

We report a case of gangrene of the bladder in an 86-year-old male who presented with abdominal pain, urinary tract infection symptoms and the cachexia-anorexia-asthenia syndrome.

We are reporting the case of a man presenting with gangrene of the anterior abdominal wall secondary to urinary bladder rupture. The work has been reported in line with the SCARE 2020 criteria [3].

2. Case report

An 86-year-old man, with a history of peripheral arterial disease and hip replacement surgery.

He presented to the emergency department with abdominal pain. The patient reported experiencing abdominal pain predominant in the hypogastrum for the past ten days, along with a burning sensation while urinating. He also complained of asthenia and anorexia for the same duration. Additionally, he lost 10 kg of weight in just 15 days.

On arrival at the emergency department: the patient was clinically

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<https://doi.org/10.1016/j.ijscr.2023.108345>

Received 7 April 2023; Received in revised form 18 May 2023; Accepted 18 May 2023

Available online 24 May 2023

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stable with significant dehydration, a soft abdomen, hypogastric tenderness with a palpable mass. Bladder test showed a full bladder at 800 cm³, and upon performing a urinary catheterization, purulence and hematuria were observed.

Biologically, significant inflammatory syndrome with CRP at 378 mg/L, leukocytes at 107,000/mm³ predominant over neutrophils, Procalcitonin at 16 ng/mL, acute renal failure KDIGO III with hyperkalemia at 6.86 mmol/l and creatinine at 1000 µmol/L.

The patient then underwent a non-injected Abdominopelvic CT scan given the acute renal failure revealing unclassified acute pancreatitis, circumferential parietal thickening of the bladder, associated with significant inflammatory infiltration of the perivesical fat and presence of air within the bladder wall and lumen in favor of emphysematous cystitis.

Introduction of a double antibiotic therapy (ceftriaxone + 1750 mg of amikacin) and hydration.

Faced with hypotension at 84/47 mmHg, tachycardia at 112 bpm, FR 19/min, and saturation of 96 % on ambient air, the patient receives 2 L of physiological saline.

Then the patient was transferred to intensive care for further management of Urosepsis with Organic acute renal insufficiency and acute pancreatitis.

On the urological and surgical levels: new abdomino-pelvic CT scan performed with portal time injection on the next day showing that parietal enhancement is not present on the left edge of the bladder dome

over a length of approximately 5 cm, indicating necrosis (Fig. I). The patient is urgently transferred to the operating room after having received 2 Fresh Frozen Plasma.

The patient presented with a generalized contracture, but the CT scan also revealed an unclassified associated pancreatitis.

Given the results of the scanner which showed a bladder perforation, we decided to perform an exploratory laparotomy preceded by a cystoscopy, in order to possibly place a ureteral stent (also known as double-J stent), the purpose of which is to eventually perform a conservative treatment by partial cystectomy (Fig. II).

In the operating room Exploration finally identified gangrene localized on the bladder dome.

During exploratory laparotomy showed us a perforated bladder with no apparent sign of a bladder tumor. So, the macroscopic aspect shows necrotic areas of the bladder (Fig. III).

Based on the findings from the surgical exploration, the decision was made to perform a total cystectomy due to the presence of pus throughout the posterior aspect and necrosis on the dome of the bladder.

Following the procedure, the patient was admitted to the intensive care unit.

The patient had a pulmonary embolism about twenty days post-operatively

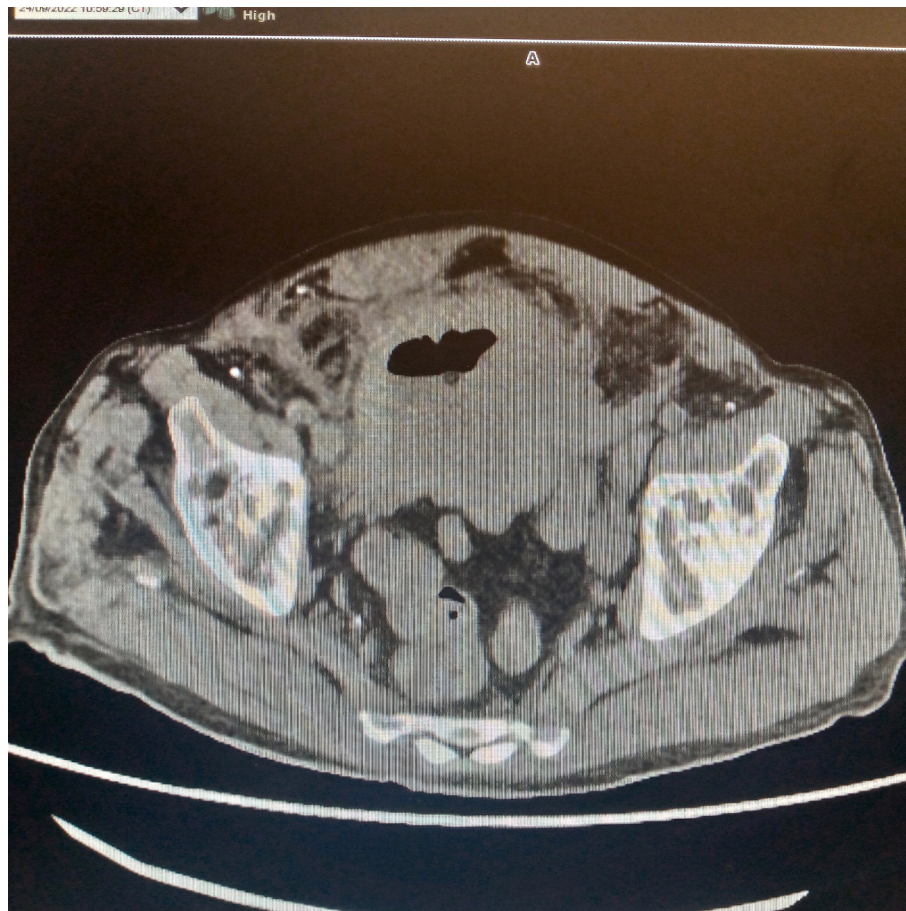


Fig. I. The CT scan revealing a bladder perforation and the presence of gas within the anterior bladder wall and retropubic space.

Table 1
Comparison of different recent cases of bladder gangrene and their management.

Cases	Age/sex	Germ/ Urine culture	Antibiotic therapy	Surgical treatment	Pathology	Outcome	Medical history
Mohamed Hafedh Saadi 2021 [6]	62 years old	unmentioned	Empiric antibiotic	Bilatéral nephrostomies Excision of all necrotic tissue Then palliative Management by turb	Massive transmission cell carcinoma with minimal micropapillary differentiation	The patient did well without complication post operatively	Bladder tumor 2 months before
Antonella De Rosa 2011 [7]	42 years old man	E coli	Broad spectrum antibiotics	Partial cystectomy	Gangrenous cystitis	Unmentioned	Chronic smoker
Sonia Ketari 2013 [8]	36 years old man	E coli	Ciprofloxacin Cefotaxime Metronidazole During two weeks	Debridemnt and Partial cystectomy was performed	Necrosis of the bladder mucosa and the smooth muscle layers	Postoperative follow-up	Chronic alcoholism
Konstantinos Katoulas 2018 [9]	63 year old woman	Urine culture was negative	Ciprofloxacin 800 mg/day Amikacine 100 mg/day	Partial cystectomy+ Suprapubic catheter	Extensive necrosis of the entire bladder wall	Multiple organ dysfunction and septic shock	Type 2 diabetes Cirrhosis
Ramanitharan Manikandan 2019 [10]	24 year old primigravida	Unmentioned	Unmentioned	Neobladder reconstruction which was anastomose to small native bladder	Unmentioned	The postoperative course was uneventful	She had undergone vaginal delivery 20 days back which had prolonged duration of labor
Our case (2023)	86 year old man	<i>Morganella morganii</i>	Double antibiotic therapy (Rocéphine +1750 mg of Amiklin)	Radical cystectomy	The Bladder wall is the site of panparietal of necrosis the opposite dome and the posterior surface associated with a dense polymorphic suppurative inflammatory infiltrate.	Favorable postoperative evolution	History of peripheral arterial disease

3. Discussion

Emphysematous cystitis is a rare form of acute inflammation of the bladder mucosa and the underlying muscle. It is observed most often in middle-aged patients with diabetes (50 % of cases) and is twice as common in women as in men.

The scanner is the reference examination both for the positive diagnosis (parietal emphysema and presence of bladder endoluminal gas) and for the differential and/or etiological diagnosis.

The clinically severe form (septic shock, acute abdominal pain syndrome) should evoke gangrenous cystitis, which has become rare (240 published cases, most of them pre-dating the antibiotic era) but justifies the use of special treatments, hyperbaric oxygen therapy and sometimes requires an emergency cystectomy [2].

Emphysematous cystitis (E.C.) is most commonly seen in patients in their sixties [4]. Two patients in the discussion board fall within this age group [6,9]. The literature has identified two predisposing etiological factors since 1883 [4]: diabetes and lower urinary tract obstruction. The obstruction of the lower urinary tract is observed simultaneously in all cases and diabetes was identified in one patient [9].

Obligate anaerobes, such as *Clostridium perfringens*, rarely affect the urinary tract and are thus rarely implicated in emphysematous cystitis. Emphysematous cystitis is usually caused by an infection with facultative aerobic/anaerobic germs [4]. Optional aerobic/anaerobic germs including E. coli were the cause in two cases [7,8] and *Morganella morganii* in our case.

The fever is usually moderate. Severe sepsis with deterioration of the general condition and impaired consciousness should make us think about this diagnosis.

Gangrenous cystitis deserves to be differentiated from emphysematous cystitis due to its poor prognosis. While infection and bladder distension can be shared with emphysematous cystitis as contributing

circumstances, the existence of chemical or physical irritation of the bladder is cited [5] as a primary cause of gangrenous cystitis. The latter condition is also much less frequent than emphysematous cystitis. Total ischemia and bladder necrosis are at the basis of the severity of this condition.

The use of broad-spectrum antibiotics associated with surgical treatment was mentioned in most of the cases listed in the discussion table (83 %) including our case [6–10].

4. Conclusion

Emphysematous cystitis is a rare disease, it is seen mainly in diabetic patients.

Diagnosis is mainly based on computed tomography which remains the key examination to confirm the diagnosis and assess the severity of the lesions.

Management is based on empirical antibiotic therapy with surgical treatment.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-chief of this journal on request.

Ethical approval

The ethical approval has been exempted by our institution sources of funding: hospital management (Mohamed VI University Hospital, Oujda, Morocco).



Fig. II. Intraoperative picture showing urinary bladder rupture.

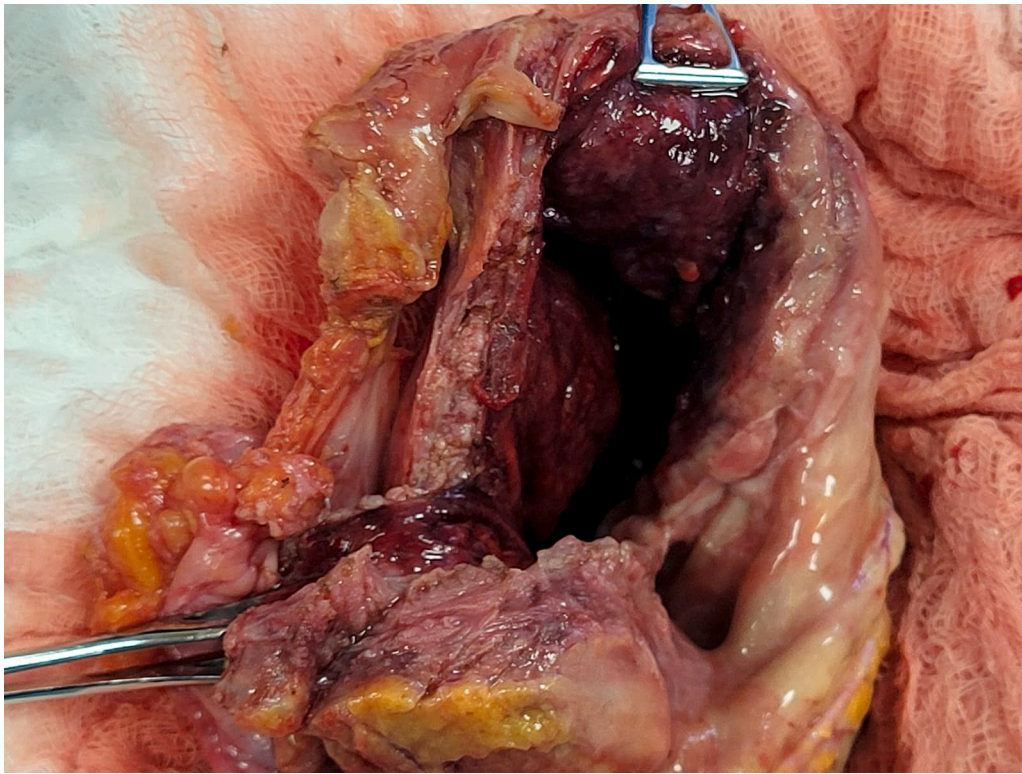


Fig. III. Intraoperative picture showing urinary bladder rupture.

Funding

No.

Author contribution

Youssef Kouiss: write the paper.

Tarik Aider: Paper writing, revision and the surgical management.

Ali Barki supervised the paper writing.

Guarantor

Youssef Kouiss.

Research registration number

Not required.

Declaration of competing interest

No.

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